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**FARMERS' BULLETIN 1071**  
**UNITED STATES DEPARTMENT OF AGRICULTURE**

# Making WOODLANDS PROFITABLE *in the Southern States*



## *Make Your Woodland PAY.*

### FARM FORESTRY HELPS FARMERS IN:

- Marketing timber profitably.
- Supplying timber for farm needs.
- Furnishing paying employment during the winter.
- Making waste lands yield a profit.
- Increasing the sale value of the farm.

### FARM FORESTRY MEANS:

- Improving the woods by the right kind of cutting.
- Protecting the woods from fire and other injuries.
- Utilizing farm timber to the best advantage.
- Reclaiming gullies and utilizing waste lands by planting forest trees.
- Keeping the home forest growing at its maximum rate of production.

*Farm forestry*, as a branch of agriculture, is the handling of forest trees and woodlands in such a manner as to increase the income and permanent value of the farm and add to its comfort and attractiveness as a home.

Contribution from the Forest Service

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# MAKING WOODLANDS PROFITABLE IN THE SOUTHERN STATES.

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## HOW FARM FORESTRY PAYS.

**F**ARM FORESTRY, like the raising of corn crops, concerns the farmer chiefly as a matter of dollars and cents, and farm forestry may be said to be the handling of forest trees and woodlands in such a manner as to increase the income and the permanent value of the farm.

Farming in the Southern States has progressed to the point where farm owners are interested in conserving all the resources of the farm instead of allowing some of them to be wastefully handled. Young trees are generally recognized to be the foundation for the future crop of timber, and worth considerable care and attention. Now that the original-growth pine and the largest and most valuable hardwoods are nearly all gone from the farms, old-field pine and second-growth timber compose the woodlands and are the subjects of chief interest. Rapid-growing kinds of trees are favored and, as a rule, slow-growing trees are being eliminated.

Valuable and useful trees on the farm are a sort of savings bank account, which, if rightly handled, may be drawn upon each year without reducing the principal. Since timber and wood are required for the successful operation of a farm, and since most farms have more or less rocky, steep, wet, or poor soil that is best adapted to tree growth, the handling of woodland is legitimately a part of farm work.

In addition to the value of the home forest as a source of direct income to the farmer each year, there is another way in which it has a very distinct worth. Woodland and trees scattered about the farm undoubtedly increase the value of the place to a much greater extent than the actual selling value of the standing timber. Belts of woodland protect the growing crops, as well as the live stock and man, from cold or parching winds. Trees should be maintained on every farm not only as a source of income but also because they make living on the farm itself and in the community more comfortable and attractive.

The forest lands held by farmers in the Southern States constitute a total of about 124,000,000 acres, which is more than one-third (35 per cent) of all the farm lands of that section.<sup>1</sup> It may surprise some to know that farm woodlands represent more than one-half of the entire forest land in the Southern States, including the great holdings of the lumber companies, and yield annually about \$94,000,000 worth of timber products.<sup>2</sup> Of this amount nearly one-half is sold in the form of logs, other cut products, and as standing timber. The remainder is used on the farm. Tables 1 and 2 (p. 36) give the areas of farm woodland and the incomes to their owners for various wood products for the different States.

### MARKETING TIMBER PROFITABLY.

To make farming pay better by showing the way to the more profitable marketing of farm timber is one of the principal objects of farm forestry. The fact that usually farm woodlands contain timber that has already reached the merchantable stage makes selling more important in comparison with production in the case of woodland products than in the case of field crops or live stock.

The following suggestions show how farm timber may be disposed of to the best advantage and how various products of the woodland should be prepared and offered for sale.

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<sup>1</sup> The States referred to in this group include the 15 which follow: Maryland, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida (26 northern counties only), Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas. The figures given in this bulletin are based upon the last U. S. Census (1910), the latest information available.

<sup>2</sup> Value of timber products in 1919, on account of enhanced values and probable increased cut, estimated at about \$140,000,000.

**MARKETING CHOICE LOGS.**

High-grade logs of white oak, yellow poplar, red gum, ash, cherry, black walnut, etc., can in most cases be sold in carload lots direct to the manufacturing plants, even though these are located considerable distances away. Local wood-using plants usually buy in lots as small as a wagon or truck load. Clear logs of white oak and yellow poplar, 16 inches and up in diameter, should be sold to sawmill plants specially equipped for quartering and veneering woods. High prices at loading points make it wasteful to put such logs to ordinary use at home.

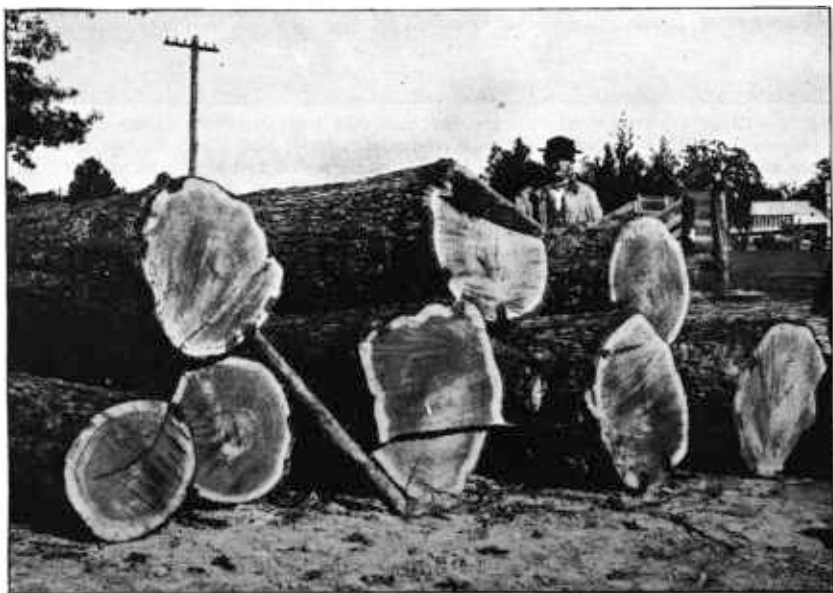


FIG. 1.—Choice white-oak butt logs and selected second cuts for shipment to the Memphis, Tenn., market. The farmer sold them at the rate of \$5 per 1,000 feet in the tree, 1 mile from the railroad, when the buyer was paying others \$14 for the same material. Such logs are often sold for \$20 to \$40 per 1,000 feet at railroad loading points.

## MARKETING PULPWOOD AND TIES.



FIG. 2.—Large quantities of pine are cut and sold from southern farms for paper pulpwood. Yellow poplar, cottonwood, red gum, tupelo, and others in less amounts are used for the same purpose. The wood must be peeled and is usually marketed in 4-foot lengths, 3 to 10 inches in diameter. Pulpwood is sold by the cord, and the prices range mostly from about \$6 to \$8 for pine and from \$9 to \$12 for poplar, cottonwood, etc. Because of the large area of woodland and forest and the rapid growth of trees, the South will undoubtedly continue to rank high in the United States in the production of paper.



FIG. 3.—Railroad ties have long been a standard farm timber product. As a rule, however, the price represents only fair wages for cutting, bawing, and hauling, with little return for the timber itself. For example, a tie 7 inches by 8 inches by 8½ feet, sold at 75 cents, all factors in the cost of manufacture being taken into account, is equivalent to a lumber value of \$24.30 per 1,000 board feet, which is low for white oak. It is often a mistake to cut a young tree for one small tie, when in a short time the tree would produce two ties. Stacks of ties, like the above in eastern Virginia, may be seen along all the railroads of the South.

WOOD FUEL AND TANNIN EXTRACT WOOD.



FIG. 4.—Chestnut wood and chestnut-oak bark are the two southern farm products used for tannin extract. Dead, worm-infested wood is taken along with the bark. Tannin extract plants provide the market and buy in carload lots direct from producers.



FIG. 5.—It is an excellent forestry practice to cut out the badly diseased, crooked, overcrowded, and inferior trees for fuel wood, giving more growing space to the straight, promising young trees and better kinds. In cutting old-field pine, a few large trees should be left for seed to restock the pine land, unless the area is to be cleared. Extensive production of wood fuel is illustrated by this scene along the water front, Washington, D. C., where over 2,000 cords of wood were piled up and more were coming from Maryland and Virginia farms every day.



**HICKORY, RED OAK, AND OTHER HARDWOODS.**

**FIG. 6.**—Hickory, from sound, rapid-growing trees, finds its best market for automobile and carriage spokes and implement handles. This kind of wood in carload lots usually brings at the railroad from \$10 to \$15 a cord for bolts cut into short, specified lengths.



**FIG. 7.**—Red oak goes extensively into lumber, wagon and car stock, implements, barrels, etc. Stave bolts are worked up in the woods to the proper length and large pieces split to the desired size. They are bought by the cord at prices ranging, for the most part, from \$8 to \$12.



**FIG. 8.**—Large amounts of small round timber and larger split sticks are used for mine timbers. All kinds of sound wood are taken. This carload contains 1,700 6-foot mine props which farmers in West Virginia sold (in 1918) for 11 cents each at the yard.

TWO MONEY-MAKING FARM TREES.



FIG. 9.—Black walnut, the highest priced of all American woods, is especially adapted for growing as individual trees about the farm. Prices depend chiefly upon diameters of logs, ranging, for the most part, from \$40 to \$150 per 1,000 feet at the loading point. It should be marketed in carload lots of logs shipped direct to manufacturers of veneer, furniture and cabinets, and firearms. Several owners might well join in a cooperative sale.



FIG. 10.—A carload usually contains about 30 to 50 black-walnut logs 12 to 16 inches in diameter, or from 18 to 25 logs of larger size. A carload usually scales from 3,000 to 5,000 board feet.



FIG. 11.—One of our fastest growing trees and most durable woods is the black (or yellow) locust. It should be cut when 15 to 30 years old to save it from severe damage by a wood-boring beetle. It is a choice fence-post wood and is in demand for treenails for building wooden ships. The average price during the war was about \$15 a cord at the railroad. The picture shows a Maryland plant cutting squares for treenails.

**TEN HELPS IN MARKETING WOODLAND PRODUCTS.**

1. Get prices for various wood products from as many sawmills and other wood-using plants as possible.
2. Before selling, consult neighbors who have sold timber, and benefit from their experience.
3. Investigate local timber requirements and prices.  
Your products may be worth more locally because transportation is saved.
4. Advertise in papers and otherwise secure outside competition.
5. Secure bids, if practicable, both by the lump and by log-scale measure.
6. Be sure that you are selling to responsible purchasers.
7. Get a reliable estimate of the amount and value of the material before selling.
8. Market the higher grades of timber and use the cheaper for farm purposes.
9. Remember that standing timber can wait over a period of low prices without rapid deterioration.
10. Use a written agreement in selling timber, especially if the cutting is to be done by the purchaser.

### SUPPLYING TIMBER FOR FARM NEEDS.

Some owners use timber that ought to be sold, while others sell timber that ought to be used on the farm. In either case money is likely to be lost.

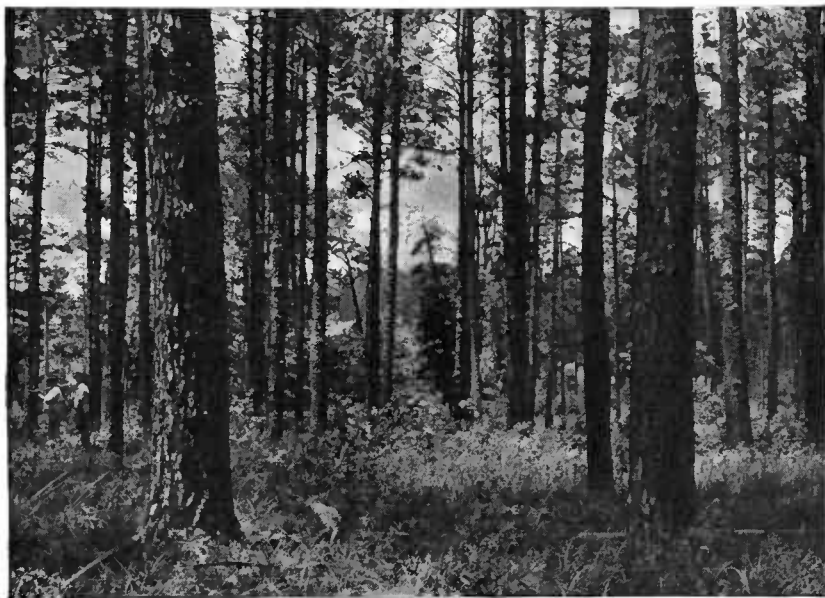
The foremost purpose of woodlands is to supply firewood, posts, rails, poles, and rough building lumber for the maintenance and improvement of the farm. Often some timber is needed at once for building or repairs, and getting it from town or a neighboring farm would mean delay and unnecessary expense. Utilization of home resources is obviously the wise and practical policy.



FIG. 12.—A big white-oak log on its way to a local sawmill in Tennessee to be made into thin strips for hoops on a homemade wooden silo. In certain cases the use of clear logs on the farm is advisable even though they are quite valuable, but for many purposes the less salable material is very satisfactory.

**WOODLANDS MEET FARM NEEDS.**

**FIG. 13.**—The value of woodland in supplying home needs is realized most fully by farmers living on cut-over lands left after steam logging operations. Practically every living tree not taken for lumber is destroyed or cut into fuel wood or pulpwood. Note the groups of small young trees in the above picture taken for paper pulpwood.



**FIG. 14.**—This mixed shortleaf and loblolly pine stand in Louisiana furnished the farm for many years with firewood, round timbers, and lumber for repairs and construction. Small stunted pines taken from here were cut into fence posts and treated with creosote. After 10 years in use about 94 out of every 100 posts set are sound and still good for years of service.

HEWED AND SAWED TIMBER FOR THE FARM.



FIG. 15.—This fence post is known to have been set in its present location in West Virginia between 1865 and 1870. After 50 to 55 years of use it shows only a little decay at the base. It is of black locust, 10 by 10 inches, and was grown on the farm.



FIG. 16.—Logs are hauled to the mill to be cut up for farm use or are sawed up at home by a portable sawmill. Small logs, from 10 to 14 inches in diameter, measured at the top end of the logs, when carefully handled, saw out from 25 to 40 per cent more lumber than they scale by the Doyle rule, the log scale commonly used in the South. Logs 20 to 30 inches in diameter will saw out not more than 10 per cent of lumber in excess of the amount indicated by the log rule.

**UTILIZING FARM TIMBER RIGHTLY.**

Failure properly to utilize farm timber is one form of farm mismanagement. Short-lived timber which, as one farmer said, "wouldn't last more than three foggy nights" in the ground, is often used for posts, making necessary heavy expense for early replacement. Millions of young pines which have been shaded out and have gone to waste in old field stands would have made fence posts and given 10 to 20 years of service if they had been properly treated with creosote. Choice white-oak butts have been seen being made into fence posts "because they worked easily," notwithstanding the fact that less than a mile away there was a sawmill which wanted such logs for quarter sawing at \$40 per 1,000 feet. Small-sized trees are being cut for ties, poles, and cordwood which should be left for additional growth. Entire woodlands which contain considerable choice timber, much more valuable for lumber, have been cut clean for nothing but ties. A custom still prevails in some parts of the South of using clear walnut for farm gates "because it won't split." The writer came across a big black walnut log, scaling 360 board feet, worth \$110 per 1,000 feet for airplane material or furniture stock, waiting its turn at the local mill to be sawed into farm-gate boards. Satisfactory substitutes could nearly always be found at home for high grades of such timber as yellow poplar, white oak, white ash, cherry, and black walnut.

In turpentineing pine, owners should insist upon the operators using the cup method on their trees in place of the ruinous boxing method still more or less in use.

UTILIZATION VERSUS WASTE OF TIMBER.



FIG. 17.—In clearing land it pays to cut small logs if they can be handled cheaply in a local sawmill. Such logs also come from thinning out young pine stands. However, trees of small sizes are usually growing rapidly in volume and increasing even more rapidly in value, so that cutting them should be deferred, as a rule, until a later time.



FIG. 18.—A valuable large pine log, left after the butt cut, 12 feet long, had been rived into "boards" or shingles. This is a case of waste due to carelessness, since with a little effort the log could have been used or sold.



## SAP PINE AND GUM FOR LASTING FENCE POSTS.



FIG. 19.—A row of creosoted black-gum posts in service for 9 years and 2 months and good for 5 to 10 years longer. At the end of 10 years, inspection by the Forest Service showed, for each hundred posts, 96 sound ones, 2 partly defective, 1 badly defective, and 1 removed on account of decay. Sweet gum when treated with creosote is also one of the most lasting woods in the ground.



FIG. 20.—A stand of pine from which large numbers of fence posts of the right size could be cut for creosote treatment, at the same time increasing the growth and value of the timber. Peeled posts, 3 to 4 inches at the top, are strong enough for line posts and less expensive to treat than larger ones.

OUTFITS FOR TREATING FENCE POSTS.



FIG. 21.—An iron tank placed on bricks over an excavation for a fire is about the cheapest and most effective small vat for treating fence posts. A 27-inch gasoline drum with a defective head (to be chiseled out) can usually be purchased cheaply, but is not deep enough for standard posts. *Farmers' Bulletin 744*, "Preservative Treatment of Farm Timbers," tells much about how to set up and operate small treating plants on the farm.

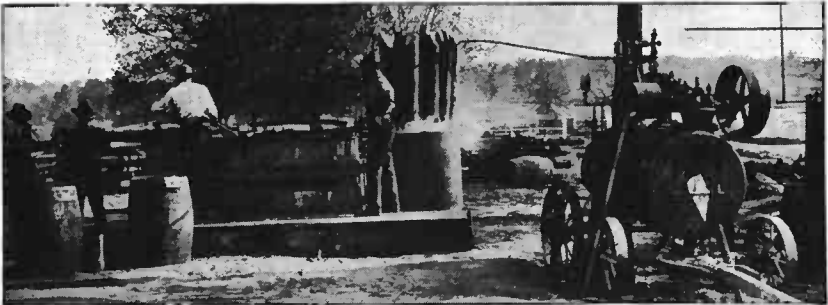


FIG. 22.—A very satisfactory outfit for cooperative open-tank treating consists of an upright cylindrical steel tank about 3 feet across by 4 feet high, and a rectangular flat tank 8 feet long. These provide for several "charges" of posts a day in both the hot and cold treatments. The tanks are most satisfactorily heated by steam furnished by a farm engine. Two hundred or more posts, depending upon their size, can be completely treated in a day. (The gum posts shown in Fig. 21 were treated in the operation here illustrated.)

## GOOD AND POOR UTILIZATION.



FIG. 23.—A fire-killed stand of loblolly pine in Virginia about to be marketed for pulpwood at a net profit of about \$1 per cord. The bark slipped off readily a little more than one year after the fire, as shown on one tree, and the wood was in good condition for paper pulp. The owner had thought the stand of no use for the wood and intended burning it off in his desire to get a new stand of trees.



FIG. 24.—Poor utilization of timber in South Carolina. Though the tops were worked into cordwood down to pieces 2 inches in diameter and fully utilized, large, high stumps containing the choicest grades of lumber were left.

### PROFITABLE EMPLOYMENT FOR WINTER.

Farmers, as a rule, have too much to do at certain times of the year and not enough at others. Many farms are unprofitable because their owners have little or nothing planned for winter. Wood cutting can be done at any time, but cool weather favors the rate of production, and in the winter the work does not conflict with that on regular field crops. If cut in winter, logs are not subject to rapid drying, or to deep checking at the ends of the logs, which often occurs in summer-cut logs and appreciably reduces their sale value.

Because of injury resulting from the southern pine bark beetle in the hot season, it is practically necessary to cut pine in the fall and winter months. Damage and loss in summer often come from wood-rotting fungi, including the "bluing" and other staining of wood. For these reasons a good many farmers turn profitably to logging and sawmilling for a few fall or winter months each year. Nearly every kind of wood product can be satisfactorily handled in winter.

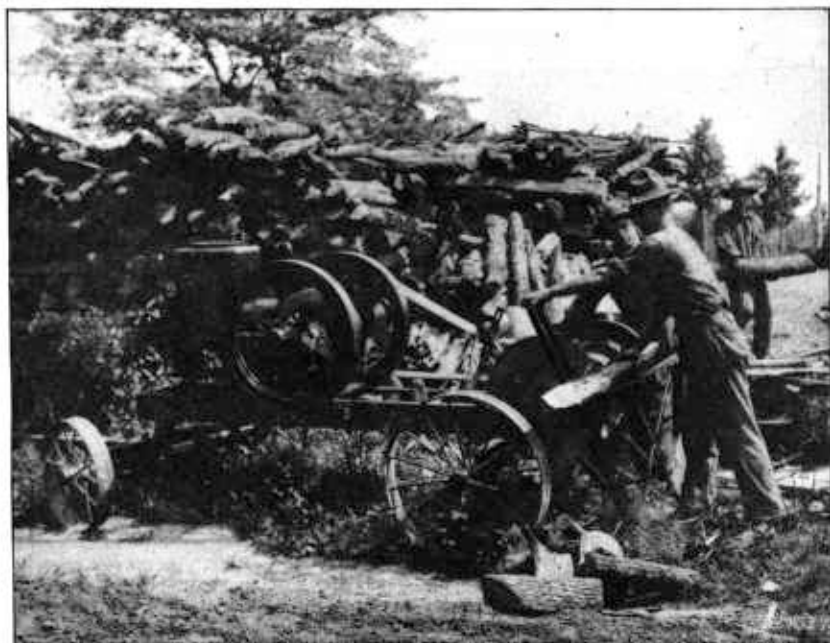


FIG. 25.—A modern portable wood-sawing outfit with a capacity of 10 to 15 cords of pine a day. The total quantity of cordwood produced yearly in the Southern States is estimated at not less than 60,000,000 cords, of which some 49,000,000 are used on the farms.

## THINNING AND TREE PRUNING IN WINTER.



FIG. 26.—When trees are properly spaced, nature “self-prunes” the lower branches. But in farm-timber tracts of small size and with valuable kinds of trees, pruning is often a paying practice, especially if it is done during slack times in the winter. Straight clear trunks are more salable than rough, limby wood. The pruning of black locust, however, is probably not advisable because of the danger of increasing infestation by the locust tree borer. The pruning of forest trees on large timber tracts, as a rule, does not pay.



FIG. 27.—Thinning young pine for increased growth is good winter work. Material to be used for treated fence posts should be cut several months in advance in order to have it well seasoned. While spring is the best time for peeling, other work crowds the farmer then, and it is often necessary to cut the post timber in winter and use a draw knife for peeling. Old-field pine yields large quantities of posts of the right sizes, namely, from 3 to 4 inches in top diameter. To avoid tightening of the bark by drying, the peeling should be done immediately after cutting.

**CUTTING YOUNG AND OLD TIMBER.**

Ash and red gum illustrate well the advisability of cutting different kinds of wood at different ages. Ash, like hickory, is best when relatively young, while young red gum has slight value.



**FIG. 28.**—Ash timber of best strength and elasticity is found in rapid-growing trees from 8 to 14 inches in diameter. After this size is reached, as a rule, the quality becomes poorer. White ash, about 35 years old, being cut for implement and tool-handle stock.



**FIG. 29.**—Red-gum logs in Mississippi, in good condition for making veneer and high-grade lumber. The extensive increase in the use and price of red gum is due to the color and attractive figure of the wood and to the better methods of seasoning at the mill. Only old trees possess the desirable qualities. Young red or sweet gum have scarcely any value except for use as treated fence posts.

## PROTECTING WOODLAND FROM INJURY.

Not mentioning the injury to the forest due to improper methods of cutting, the chief enemies of the forest are fire, insects, fungi, cattle, and hogs. That young growth in the woods is "brush" and something to be rid of is a prevalent but mistaken conception. One often hears a woodland well stocked with young trees spoken of as "right smart of a wilderness," but a forest can not maintain itself long without reproduction any more than can a town with none but old people. For the sake of getting a scattering of green grass in the spring, the woods are fired regularly in some localities, hundreds of thousands of small trees are killed, and merchantable timber is badly injured or destroyed. The rich vegetable fertilizer, made under the old-field pines and the hardwoods of the South, and worth millions of dollars yearly, is sufficient reason to justify taking energetic measures against fire. Cattle and hogs in hardwoods, and hogs in longleaf pine, keep the forest from restocking. Damage from insects can be reduced by cutting timber at the proper time of the year and by utilizing lightning-killed trees without delay. In case of infestation or damage by forest insects it is suggested that the Bureau of Entomology of the Department of Agriculture or the State forester be consulted.



FIG. 30.—Many woodlands do not pay because their owners allow them to be overrun by grazing stock which, by eating down the tender seedlings, prevent the woods from restocking. Cattle break up the protective leaf mulch which keeps the trees growing during the long dry spells. Plenty of shade should be provided for stock, but grazing should be divorced from timber growing. All larger openings where light comes through should be filled with younger trees—the children of the forest. Fully stocked woods contain little or no grass, but afford full shade which prevents the soil drying out and keeps the trees growing during the dry spells of midsummer.

**HOGS—A SERIOUS ENEMY OF LONGLEAF PINE.**



FIG. 31.—It is now well established that hogs are among the chief enemies to the young growth coming in on cut-over longleaf pine lands. The men shown in the picture are standing in the middle of an acre tract where hogs in one season killed 8,320 longleaf seedlings two years old. In other tracts inspected in the same section the losses were mostly at the rate of 4,000 to 7,000 per acre. The seed, or "mast," of longleaf is devoured as food by hogs, and the seedlings have a thick, spongy, mucilaginous bark on the roots much sought by hogs in the spring when the ground is soft.



FIG. 32.—As a result of fencing against hogs 14 years ago when the longleaf pine was first cut, and of protection from fire, this tract in eastern Texas has a full stand of 1,000 longleaf trees per acre from 3 to 6 inches in diameter and from 25 to 30 feet in height.



**FIRE—THE ARCH ENEMY OF THE FOREST.**

**FIG. 33.**—Fighting a fire to keep it from burning fences, crops, and buildings on a near-by farm. Thousands of small seedlings, which started during the three years since the last fire, are being destroyed or badly injured. Longleaf pine saplings, with their thick bark and heavy green leaves or "straws," exhibit wonderful fire-resisting powers, but under repeated burning lose vitality, become stunted, and, with occasional exceptions, are killed when from 5 to 10 years old. Other kinds of pine and all hardwoods are easily killed back by fire.



**FIG. 34.**—Longleaf pine cut-over lands in northern Louisiana containing a full young stand of shortleaf and loblolly pines as a result of protection from fire. Extensive areas of such cut-over lands come up to slash, shortleaf, and loblolly pines, the small seeds of which are widely scattered by wind from occasional trees left in the section and are practically immune from hog damage.

### IMPROVING WOODLAND BY CUTTING.

Lack of proper thinning and cutting is a common cause of woodland being unprofitable. Nature usually overcrowds trees in a given space, and the battle for existence results in the weaker succumbing to the stronger. Trees should have sufficient supplies of light and soil moisture if they are to thrive and be profitable.

An acre of ground will grow a certain amount of wood, and, by controlling the number of trees, it is possible to influence their rate of growth and eventually their size. Except for cordwood, fewer large trees are usually more desirable than many small ones. It is well, if practicable, to have valuable kinds of wood growing in place of common woods of relatively low value.

Our woodlands, as a rule, contain many crooked, forked, diseased trees which should give way to straight, sound ones. The average farmer, accustomed to looking forward only as far as one crop at a time, does not realize how promptly, following an improvement cutting, trees show an increased growth; and how, by the selection of the inferior trees for cutting, the whole woodland is increased in value.

With an active market for cord wood, and with the use of treated fence posts and poles, an opportunity is afforded for thinning overcrowded stands, especially old-field pine, and clearing out the inferior trees—diseased, dying, crooked, and less valuable kinds. Right cutting includes also the removal of large sound trees whose growth is slow, because they are nearing or have reached maturity. The cutting should be done only at a time of favorable market conditions, or when building or other timber is wanted on the farm.



FIG. 35.—About one-third or one-half of the trees should be removed from this young shortleaf pine stand. Those cut should be the suppressed or stunted small trees, and a few of the larger trees where overcrowding occurs. The volume of wood removed in such cases is usually only from one-tenth to one-fifth of the total. This stand is being marked for winter thinning. The remaining trees will probably grow nearly twice as fast after the thinning.

## DIFFERENT KINDS OF IMPROVEMENT CUTTING.



FIG. 36.—Well-thinned stand of longleaf pine in Georgia, which started in an old field about 35 years ago. The smaller crowded trees have been taken out from time to time and used, leaving the larger ones well spaced for maximum growth and showing a good development of the individual trees.



FIG. 37.—Marking yellow poplar for a pulpwood sale next winter. The green foliage helps to identify the kinds of trees and to determine whether the trees are crowded at their tops and need to be thinned. It is, therefore, always desirable to select and mark the trees in summer. White paint or light blazing of the bark are employed for marking trees to be cut.

DIFFERENT KINDS OF IMPROVEMENT CUTTING.



FIG. 38.—Woods in need of improvement. If the forked crooked oak (right) and the crooked elm (center) were cut, the valuable ash trees (left) would have more light and the root space needed for increased growth. This tract is now being handled as a demonstration woodland by the county agricultural organization. This kind of improvement cutting is being increasingly practiced and gives good returns.



FIG. 39.—Black walnut stunted and finally killed by grapevines. The injurious effect of vines upon tree growth and the resulting money loss are little realized. The injury is caused chiefly by the enemy vines shading out the foliage of the supporting tree. This owner could easily have cut the vines, as the tree stood near the buildings.

## RIGHT KINDS OF CUTTING.



FIG. 40.—Woods containing large and small sized timber. The mature trees may be marketed at favorable times or used when needed. Removing the crooked, unpromising saplings and leaving the good ones would greatly improve the quality of the future stand and increase the money returns.



FIG. 41.—The right kind of cutting. Profitable logs in the top part of the trees are often left in the woods. No greater waste occurs in logging than that caused by leaving high stumps. These, as a rule, contain the clearest and highest-priced material. The timber saved by cutting low stumps often pays in large part for the logging operation.

### MAKING WASTE LAND PROFITABLE.

Timber is essentially a poor-land crop. Steep slopes, poor soil, rocky land, unused corners, gullied land, and wet land afford places for growing timber profitably. These various classes of so-called waste land, as a rule, are better adapted for forest production than for any other use. If trees do not occur naturally, planting them on idle and unremunerative parts of the farm would be a wise step toward securing useful and money-making trees at the cost of only a small amount of labor. Certain kinds of trees, moreover, like the locust and acacias, build up poor soil through the nitrogen-gathering bacteria in the root nodules.

The soil-holding power of trees on slopes is well known. Steep lands which have been cleared of timber at much expense of labor, and have been cultivated for a few years, often rapidly become gullied, and the rich bottom lands below are covered with deep sandy deposits. Maintaining a forest cover on the slopes is the surest and cheapest method of protection. While small gullies can be stopped by closely packed brush and tree tops, anchored by stakes if necessary, large open gullies are checked successfully only by tree planting over the entire gully basin, supplemented by low brush dams across the larger units of the gully. In this manner erosion is checked, and profit eventually arises from the foresting.



FIG. 42.—Slash pine, 13 years old, on sandy land in northern Florida, yielding the owner \$10.20 per acre for turpentine, besides 12 cords per acre of firewood or pulpwood. Young pine, when properly spaced and protected from fire, grows surprisingly fast in all the Southern States. Slash and loblolly pines grow the fastest. Short-leaf pine belongs to the Piedmont region, and loblolly, longleaf, and slash to the Coastal Plain. All, except longleaf, are called "old-field pine" in their respective sections. Because of its high turpentine production, slash pine offers the largest profits. No soil is too poor for some kind of pine.

**MAKING HIGH RIDGES AND SLOPES PROFITABLE.**

**FIG. 43.**—How the forest protects the soil against water erosion is readily learned by examining the loose porous soil under a heavy growth of trees. Thousands of acres of steep slopes have, unfortunately, been cleared off because the owner failed to realize that soon after the protective timber was taken off the soil would be packed by the rains and baked hard by the sun, becoming of little value for agriculture. Fields in the flats, pastures on the hillsides, and woods capping the ridges—each type of land contributes to the success of the farm.



**FIG. 44.**—This field has been cleared twice for crops. Such clearings on hillsides can usually be worked for only two or three years before they "wash" badly and have to be abandoned. This practice is very wasteful, for the owner has neither timber nor tillable land left.

WORN-OUT AND ROCKY LANDS.



FIG. 45.—A black-locust grove, started 20 years ago, on a gullying cornfield in middle Tennessee. Measurements taken show that it now has fence-post timber worth in the standing tree \$188 per acre, or a yearly gross profit of \$9.40 per acre.



FIG. 46.—Rocky outcroppings in a limestone belt in West Virginia in 30 years produced timber at the rate of \$10 a year per acre, besides a heavier stand of bluegrass than on adjacent land exposed to full sunlight.



**PASTURES AND GULLIES.**

**FIG. 47.**—Pastures with black-walnut trees yield income. The owner of this farm in 1918 sold about 30,000 board feet of black walnut from his woodland and pastures for \$70 per 1,000 board feet log rule, in the standing tree.



**FIG. 48.**—Gullies are the most perfect examples of waste land, particularly those in rich agricultural soil. This farm gully in west Tennessee has been completely checked, and, although only seven years have elapsed since treatment began, it is now yielding returns from grazing and is producing trees for fence posts.

RECLAIMING GULLIES BY PLANTING TREES.



FIG. 49.—Valuable farm land rendered useless by lack of soil cover protection. In practically every county such losses in farm values are going on, sometimes at a rapid rate. They can be stopped by forest planting. This county agent is doing much in assisting farm owners in the county to reclaim these rapidly enlarging waste places.



FIG. 50.—A big gully conquered by planting trees. These trees are now five years old, and the soil is well covered with bluegrass and many other plants and shrubs. Cattle now graze here under regulation to prevent damage. In planting trees, where possible, the soil should first be loosened up by plowing, disk harrowing, or spading the spot where the small trees are to be set. One or two year old seedlings are usually most satisfactory.

**INCREASING THE SALE VALUE OF THE FARM.**

**FIG. 51.**—Mixed hardwoods and pine cover the rocky ridge running across the path of the prevailing winds. Belts of growing timber afford protection to the farmstead and live stock against cold winds and, by checking the hot, drying winds in summer, prevent damage to growing crops.



**FIG. 52.**—A profitable woodland is one which returns a fair rate of interest on the investment and adds to the home comfort and attractiveness of the farm.



**FIG. 53.**—The presence on the farm of nut-bearing trees, like this sturdy and handsome pecan, obviously helps to make the farm not only more attractive as a home but also far more salable.

## FORESTRY DEMONSTRATIONS IN PROGRESS.

HOW TO KEEP THE WOODLAND AT ITS MAXIMUM PRODUCTION.



FIG. 54.—Farm owners in North Carolina estimating and valuing timber and considering the most profitable method of handling this hardwood tract belonging to one of the group.



FIG. 55.—A field demonstration in forestry in South Carolina. The farmer is as much interested as any other in a proposition which is capable of materializing in the form of a check. By keeping the woodland well stocked with high-grade trees growing at their capacity, a substantial sum may be added yearly to the farm income, and the sale value of the farm will be increased.

TABLE 1.—Areas of woodland on farms, farm areas (from the 1910 census), and forest lands, by States.

States.	Farm woodlands.				Farm lands.		Forest lands. <sup>1</sup>		Total land area.
	Total area.	Average area of woodland per farm.	Per cent of total farm area.	Per cent of total forest area.	Total area.	Per cent of total land area.	Total area.	Per cent of total land area.	
	<i>Acres.</i>	<i>Acres.</i>			<i>Acres.</i>		<i>Acres.</i>		<i>Acres.</i>
Alabama.....	9,444,764	35.9	45.6	47.2	20,732,312	63.2	20,000,000	60.9	32,818,560
Arkansas.....	8,511,510	39.6	48.9	35.2	17,416,075	51.8	24,200,000	72.0	33,616,000
Florida.....	<sup>2</sup> 2,006,162	<sup>2</sup> 61.1	<sup>2</sup> 55.8		<sup>2</sup> 3,595,272	<sup>2</sup> 26.0	20,000,000	57.0	35,111,040
Georgia.....	13,002,741	44.7	48.2	58.3	26,953,413	71.7	22,300,000	59.3	37,584,000
Kentucky.....	3,568,910	26.8	31.3	+69.5	22,189,127	86.3	10,000,000	38.9	25,715,840
Louisiana.....	4,316,561	35.8	41.3	26.2	10,439,481	35.9	16,500,000	56.8	29,061,760
Maryland.....	1,467,333	30.0	29.0	66.7	5,057,140	79.5	2,200,000	34.6	6,362,240
Mississippi.....	7,883,558	28.7	42.5	45.0	18,557,533	62.5	17,500,000	59.0	29,671,680
North Carolina.....	12,451,739	49.1	55.5	+63.5	22,439,129	71.9	19,600,000	62.8	31,193,600
Oklahoma.....	3,568,910	18.8	12.4	44.6	28,859,353	65.0	8,000,000	18.0	44,424,960
South Carolina.....	6,339,142	35.9	46.9	52.8	13,512,028	69.2	12,000,000	-61.5	19,516,800
Tennessee.....	8,007,733	32.6	40.0	53.4	20,041,657	75.1	15,000,000	56.2	26,679,680
Texas.....	27,658,413	66.2	24.6	92.2	112,435,067	67.0	30,000,000	17.9	167,934,720
Virginia.....	8,414,680	45.7	43.2	60.1	19,495,636	75.7	14,000,000	54.3	25,767,680
West Virginia.....		41.0	39.6	43.6	10,026,442	65.2	9,100,000	59.2	15,374,080
Total.....	123,993,708	<sup>2</sup> 40.2	<sup>2</sup> 35.0	<sup>2</sup> 55.3	351,749,665	<sup>2</sup> 66.2	240,400,000	42.9	560,832,640

<sup>1</sup> Includes all forest and woodland. <sup>2</sup> Twenty-six northern counties. <sup>3</sup> Does not include Florida.TABLE 2.—Income from farm woodland, by States, showing values of products sold and used on the farms in the Southern States (1910 census).<sup>1</sup>

State.	Per farm (reporting).				Total for States.		
	Used on farm.	Sold. <sup>2</sup>	Total.		Used on farm.	Sold. <sup>2</sup>	Total.
			Value.	Per cent of total income.			
Alabama.....	\$36	\$21	\$57	4.4	\$3,827,481	\$2,480,670	\$6,308,151
Arkansas.....	36	28	64	6.2	4,205,944	2,708,318	6,914,262
Florida.....	<sup>3</sup> 92	101	<sup>3</sup> 193	<sup>3</sup> 11.6	1,133,476	1,242,406	2,375,882
Georgia.....	52	23	75	6.2	5,734,030	3,204,360	8,938,390
Kentucky.....	44	57	101	7.0	3,581,244	4,261,898	7,843,142
Louisiana.....	50	54	104	3.4	1,669,536	1,914,777	3,584,340
Maryland.....	55	54	109	6.5	1,275,716	1,073,329	2,349,045
Mississippi.....	38	20	58	4.8	4,209,029	2,393,914	6,602,943
North Carolina.....	35	34	69	8.4	5,414,460	5,949,674	11,364,134
Oklahoma.....					1,227,906	374,814	1,602,720
South Carolina.....	38	24	62	3.3	3,092,453	1,420,639	4,513,092
Tennessee.....	30	23	53	6.2	4,559,591	3,951,119	8,510,710
Texas.....					5,714,728	3,210,934	8,925,662
Virginia.....	29	54	83	8.6	4,357,699	5,761,152	10,118,851
West Virginia.....	39	62	101	10.4	1,267,504	2,736,980	4,004,484
Total.....					51,270,824	42,684,984	93,955,808

<sup>1</sup> Because of greatly increased timber values and strong market demand, these figures are probably from 40 to 60 per cent too low for 1919.<sup>2</sup> Cut forest products sold or for sale and all standing timber sold.<sup>3</sup> Northern part—26 counties.

**PUBLICATIONS FOR REFERENCE.**

**UNITED STATES DEPARTMENT OF AGRICULTURE PUBLICATIONS.**

The following publications refer to phases of forestry that are interesting to the owner of farm woodland. Some are no longer available for free distribution, and the prices at which they may be purchased are indicated. Application for free publications should be made to the Forest Service, Washington, D. C., and for all others to the Superintendent of Documents, Washington, D. C. Inclosure should be made of the amount of the purchase. Stamps are not accepted.

The Preservative Treatment of Farm Timber, Farmers' Bulletin 744.

The Care and Improvement of the Woodlot, Farmers' Bulletin 711.

Measuring and Marketing Woodlot Products, Farmers' Bulletin 715.

Machinery for Cutting Firewood, Farmers' Bulletin 1023.

The Dying of Pine in the Southern States: Cause, Extent, and Remedy, Farmers' Bulletin 476. Price, 5 cents.

Waste Land and Wasted Land on Farms, Farmers' Bulletin 745.

What the Farm Contributes Directly to the Farmer's Living, Farmers' Bulletin 635.

A Primer of Forestry, Part I: The Forest, Farmers' Bulletin 173. Price, 5 cents.

A Primer of Forestry, Part II: Practical Forestry, Farmers' Bulletin 358. Price, 5 cents.

Uses of Chestnut Timber Killed by the Bark Disease, Farmers' Bulletin 528.

Advice to Forest Planters in the Plains Region, Farmers' Bulletin 888.

Small Sawmills, Department Bulletin 718.

Forest Management of Loblolly Pine in Delaware, Maryland, and Virginia, Department Bulletin 11. Price, 15 cents.

Shortleaf Pine: Its Economic Importance and Forest Management, Department Bulletin 308. Price, 15 cents.

Life History of Shortleaf Pine, Department Bulletin 244.

The Southern Cypress, Department Bulletin 272. Price, 20 cents.

The Ashes: Their Characteristics and Management, Department Bulletin 299. Price, 25 cents.

Cottonwood in the Mississippi Valley, Department Bulletin 24.

The Red Gum, Forest Service Bulletin 58. Price, 15 cents.

The Commercial Hickories, Forest Bulletin 80. Price, 15 cents.

Scrub Pine, Forest Service Bulletin 94. Price, 15 cents.

Forest Planting in the Eastern United States, Department Bulletin 153.

Advice for Forest Planters in Oklahoma and Adjacent Regions, Forest Service Bulletin 65. Price, 5 cents.

The Status and Value of Farm Woodlots in the Eastern United States, Department Bulletin 481.

Forest Conservation for States in the Southern Pine Region, Department Bulletin 364. Price, 5 cents.

How to Pack and Ship Young Forest Trees, Forest Service Circular 55.

How to Transplant Forest Trees, Forest Service Circular 61. Price, 5 cents.

Black Locust, Forest Service Circular 64.

Black Walnut, Forest Service Circular 58. Price, 5 cents.

Noway Spruce, Forest Leaflet 12. Price, 5 cents.

Red Cedar, Forest Leaflet 20. Price, 5 cents.

Protection of Forests from Fire, Forest Service Bulletin 82. Price, 15 cents.

## STATE PUBLICATIONS ON FARM FORESTRY.

Circulars or bulletins on various phases of farm forestry have been published by most of the southern States. No attempt is made here to list these publications. Applications from those desiring information about them should be addressed to the following:

Maryland.—State Forester, Johns Hopkins University, Baltimore.

Virginia.—State Forester, University of Virginia, Charlottesville.

West Virginia.—Director of Extension, Agricultural College, Morgantown.

Kentucky.—State Forester, Old State House, Frankfort.

Tennessee.—State Forester, State Geological Survey, Nashville.

North Carolina.—State Forester, University of North Carolina, Chapel Hill.

Director of Extension, Agricultural College, Raleigh.

South Carolina.—Director of Extension, Clemson College.

Georgia.—Department of Forestry, Agricultural College, Athens.

Florida.—Director of Extension, Agricultural College, Gainesville.

Alabama.—Director of Extension, Polytechnic Institute, Auburn.

Mississippi.—Director of Extension, Agricultural College.

Louisiana.—Superintendent of Forestry, Conservation Commission, New Orleans.

Director of Extension, Agricultural College, Baton Rouge.

Arkansas.—Director of Extension, Agricultural College, Fayetteville.

Oklahoma.—Director of Extension, Agricultural College, Stillwater.

Texas.—State Forester, College of Agriculture, College Station.